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A CRITICAL DISCUSSION OF CERTAIN PHASES IN THE DEVELOPMENT OF MODERN INFANT FEEDING: THEIR INFLUENCE UPON PRESENT TEACHINGS.

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The artificial feeding of infants has been, is, and probably will continue to be a much discussed subject. Our opinions regarding it are constantly changing and developing; its literature is assuming enormous proportions, and each year we are learning more and more concerning the fundamental nutritional processes of the infant, upon which all nutritional therapy depends. It is in a constant state of flux; certain ideas are in the foreground for a few years and then gradually recede, leaving, however, their faint or pronounced marks upon the fabric of the whole. The healthy infant has the power, in a large measure, of adapting itself to widely varying artificial diets: this accounts to a great extent for the success that pediatricians in different parts of the world have had, using their own particular methods, which may differ considerably. There is no one way to feed an infant; it is true that he must be fed a food that furnishes enough fuel value; also that he must have a food which he can digest and which contains the proper materials for the growth of his body; but it is possible to meet these demands in a variety of ways. We know, even at the present time, comparatively little about the factors which are concerned in the disturbances of digestion and of nutrition; furthermore, babies fed according to one method are likely to have somewhat different types of disturbance than those fed according to another method; therefore there is plenty of chance for different ways of looking at these disturbances, and for difference in their classification.

Liberality, broadness of vision, and respect for the opinions of others, are essential in medicine; in no branch of medicine are these qualities more essential than in infant feeding. There are many ways of approaching the subject, many viewpoints of value besides the ones which we may ourselves happen to hold, and it is vital in order to have a clear vision of the subject to give heed to the thoughts of every competent observer, to adopt what seems good in his teachings, and to amalgamate it with our own ideas.

Therefore, it should be of value to consider the development of modern infant feeding, the

opinions that have been held by the great teachers of the subject, their influence upon those who have followed them, and their relationship to the teachings of the great present day.

Biedert, Meigs, and *Rotch* (The Protein Period). Modern infant feeding may be said to have started with Philip Biedert's inaugural dissertation in 1869. Previous to this time but little scientific investigation had been produced in connection with it; the little that was known was almost entirely empirical and the results of artificial feeding were uniformly bad. Biedert's monograph of sixty-four pages is entitled "Investigations concerning the differences between human milk and cow's milk." Previous to his time there were on record many analyses of cow's milk, but few of human, and the figures varied so widely that it was quite certain that but few of them could be correct.

Cow's milk was supposed to contain about five per cent. of casein, human milk four per cent. Biedert started with the central idea that in order to have a rational basis for the artificial feeding of infants it was necessary to know the exact composition of human milk, the baby's natural food, and then to imitate this as closely as possible in the artificial mixture. He showed by many analyses that the amount of casein in human milk was very much less than that in cow's milk, about two per cent., he believed. He also laid especial stress on the fact that cow's milk when treated with acid formed large tough curds, and the human milk formed very small soft curds. This was due, he said, not only to the fact that there was much less casein in human milk than in cow's, but also that the casein was different qualitatively; cow casein was an entirely different substance from human casein. He called all the protein of milk casein, and did not know that lactalbumin was also present; with him "casein" and "protein" are synonymous terms. His two basic conceptions: that the protein of human milk is less than half that of cow's milk and that the proteins are of different quality were fundamentally correct, and were of epoch making importance. We shall find that for many years thought in infant feeding was greatly influenced by them. He thought that the ratio of fat to casein in human milk was as 3.5 to 2.00—that in cow's milk it was as 4 to 5. The more fat there was in relation to the amount of casein present, the more likely was there to be a soft curd: this was the reason that the curd of human milk was soft and small, and the curd of cow's milk was hard and large. Also, he thought that a certain amount of protein was necessary to hold the fat in emulsion and facilitate digestion; thus we see the beginnings of the idea of the importance of the ratio between the food elements.

Beidert wrote many articles after his first one, and in 1880 the first edition of his textbook appeared, going through four editions, the last in 1900. His central idea was the indigestibility of the cow casein, and his methods of feeding were all based on this. He believed that a mixture should be made in which the amount of casein should be reduced considerably below that in human milk (to 1 or 1.50%) and that the ordinary milk and water dilutions then in use did not accomplish this. In order to raise the nutritional value of the food and also to aid in the digestion of the curd, he used dilutions of cream or mixtures of whey and cream. In his cream dilutions there was a ratio of fat to casein as of 2.5 to 1, which he thought was the most favorable one for the proper digestion of the casein. The cream mixture usually had sugar added up to about 5%.

Besides his regular cream dilutions he developed his famous "cream conserve," a thick paste which would keep for a considerable period, and which needed simple dilution with water before using. This was made from casein, butter, milk, and cane sugar, and the salts of milk. When diluted, according to his directions, it contained about 2.50% fat, 4.0% sugar, 1.00% protein, and .20% salts. He recommended this for use only when fresh milk could not be obtained, and was always a vigorous advocate of mixtures made from fresh, clean milk. He attacked especially the various condensed milk mixtures and proprietary foods which had begun to spring up, and insisted that nothing could ever take the place of fresh cow's milk. Most of his writings are concerned with the chemical differences between human milk and cow's milk and the proper mixtures to feed to normal babies.

In the first edition of his textbook there are 377 pages, 321 of which are devoted to these subjects, and only 56 to pathological conditions, nor did he attempt any special classification of digestive disturbances. He believed that most

digestive troubles were due to the casein curd, he denied the good of the gruel and milk dilutions in general use, and advised strongly against feeding starch to small babies. The sugar, he thought, was practically harmless and did not recognize any particular type of indigestion caused by it. He found, however, that if too much fat was fed diarrhea resulted in certain babies, and that in these cases the fat might be as much as 50% of the dried stool. He looked at these stools microscopically and mentions the presence of an excess of fat droplets. The condition was, he said, probably due to a duodenal catarrh, which hindered fat absorption. He also described very dry white stools containing an excessive amount of fat, and thought they were due to a lack of bile secretions ("soap stools"). He believed that failure of fat absorption might have considerable importance in causing infantile atrophy, but that in acute disturbances the casein was more important.

Biedert was a scholar, a shrewd observer, a clear writer, and his ideas influenced the trend of thought in infant feeding for twenty years or more.

Developments in America—Influence of Biedert. In 1880, Dr. John Forsyth Meigs of Philadelphia was the most successful and most widely known feeder of infants in America. His methods were largely empirical, but he got better results than had ever before been obtained. About this time he asked his son, Dr. Arthur V. Meigs, to make for him some analysis of condensed milk. This led the younger Meigs to investigate the compositon of breast milk, to which he devoted a great deal of time, being interested in it up to the time of his death in 1911.

Meigs states his fundamental ideas as follows: "There are but two possible methods in endeavoring to reach a conclusion about what is right to feed babies, the one purely empiric; to experiment with various foods until the best is found; and the other by analysis to learn as nearly as possible what human milk is, which we all know to be the most perfect food for infants, and then to make an imitation of it."

In 1882 he made the statement, following much experimental work, that human milk never contained more than 1% of casein, and this statement may be said to be at the bottom of most of his ideas on feeding. This was about half Biedert's figure for the amount of casein present in human milk. Inasmuch as this is the figure for human milk, said Meigs, in artificial feeding more than 1% of casein should never be in the cow's milk mixture offered to the baby. In making a food for babies two matters should be considered; the constituents must be in the same relative proportions as they are in human milk, and they must be in a medium which shall be as human milk is, alkaline. Furthermore, it is a great mistake to keep changing a baby's food in the early months; the baby should be started on a food which shall imitate breast milk and this should be fed to him without change in strength until he is eight or nine months old. He can take as much of it in amount as he desires, however. Meigs gives the following directions for preparing this food: "One quart of whole milk is put into a pot or a high pitcher and allowed to stand three hours; then one pint is poured from this. When the child is to be fed there are taken of this weak cream three tablespoonfuls; of lime water, two tablespoonfuls; of sugar water, three tablespoonfuls. This makes four ounces of food. Sugar water is made by dissolving 18 drachms of lactose in one pint of water. This mixture contains about 4% fat, 7.00% sugar and 1% protein,—according to Meigs an exact imitation of mother's milk. He fed this to babies of all sizes and ages, in all stages of malnutrition. His results in hospital practice were rather disappointing, he says, and a good many of his babies died, but in private practice the results were most gratifying.

In 1885 appeared his little book, "Milk Analysis and Infant Feeding," most of which he devoted to a technical discussion of his methods of milk analysis, and very little to practical feeding.

Meigs summarizes his principles as follows: "The end to be striven for in order that a more general success may be attained in the artificial feeding of infants is to diffuse more widely and to make common property of the knowledge of the small amount of casein in human as compared with cow's milk, and that in addition to the dilution which is necessary to reduce the amount of this constituent, we must use in proper proportions cream, sugar, and lime water."

Meigs' influence was felt all over the country and his ideas were widely followed. He had

worked along the same lines as his predecessor, Biedert, but had added to his work in that he came nearer to the actual amount of casein in human milk, and devised a more exact formula to be used in the imitation of the baby's natural food.

About 1887 Dr. Thomas Rotch of Boston began to be interested in infant feeding. He was well acquainted with the literature of the day, and was influenced very largely by the teachings of Biedert. About the time that Meigs was doing his work in Philadelphia, Rotch began to study various infant foods. On his service at the Infants' Hospital the best results were being obtained with condensed milk. This led him to make an analysis of the condensed milk mixtures that were being fed, and he found that most of them contained very close to 1% of casein. From this he argued that 1% of casein was probably the best amount to use, so he turned to Meigs' mixture, and gave it a thorough trial. He soon began to see, however, that it had its limitations.

He said, "We begin to appreciate that the infants' idiosynerasy was not for any one of the especial combinations usually found in human milk, such as high or low total solids, or in other words a strong or a weak mixture, but that any one of the various constituents, according as it was in high or low percentage, might be the cause of what was represented by the especial idiosynerasy, and thus we arrived at the conclusion that in a multitude of variations and degrees, the human infant may have an especial idiosynerasy for a high or low percentage of any one of the foodstuffs or for any combination of them. Resulting from this we deduced that to obtain a successful feeding and nutrition for infants, we must be able to prepare an almost innumerable number of foods, varying in the percentage of any one of their ingredients, and in the combinations of these percentages. Percentage feeding is the variation of the individual food elements so that we can give various babies the percentages of these elements which are adapted to their special digestions."

These were revolutionary ideas and epoch making. Rotch cast down at a blow the teachings of the day, that human milk must be imitated, and the same mixture fed to all babies. To him we owe the birth of the idea of individualization and variation. He looked upon digestive and nutritional disturbances as being caused by elements in the diet rather than by the diet as a whole, and emphasized strongly the necessity of thinking of the food in terms of its elements.

He followed Biedert in the belief that the casein was the cause of more digestive troubles than any other food element, and recommended feeding it in very small amounts to young babies especially—smaller even than Biedert had used. The fat he regarded as secondary to the casein in importance; the sugar he thought least important of all. He devised the gravity cream, and skimmed milk method of modification, which allows of great elasticity in the preparation of milk formulae, and almost any ratio between the various food elements that is desired. He started milk laboratories in 1891 where the food was prepared exactly according to the doctor's prescription and delivered to the home ready for use. He insisted upon the necessity of thinking in percentages, and the physicians knowing as accurately as possible what is in the mixture that is being fed to a baby. He believed that very small variations in the percentage of the elements in the food were of very great significance. He wrote many papers of importance, and for long was regarded as the greatest American authority on infant feeding.

Retrospect of Biedert, Meigs, and Rotch. To Biedert we owe the first really important scientific investigations in infant feeding, and the proving that human milk and cow's milk are very dissimilar in composition, especially as regards their casein content. To Meigs we owe a more accurate analysis of human milk, and the widespread diffusion of his own and of Biedert's ideas in America. To Rotch we owe the great principle of individualization, the new conception that it is not the food as a whole, but its elements that must be considered. Much of the teachings of these men, in the light of our present knowledge, does not seem to be, and is probably not correct, but they may be regarded, however, as three of the great pioneers in infant feeding. Biedert, Meigs, and Rotch devoted most of their time to the study of what to feed to the baby; their classifications of digestive disturbances were quite secondary and relatively unimportant. They did very little regarding the physiological, bacterial, and chemical processes within the baby's body; they studied his food rather than himself. The

next four men that we have to discuss,—Widerhofer, Escherich, Czerny, and Finkelstein,—studied the baby primarily and his food secondarily.

Widerhofer, of Vienna, was essentially a pathologist. Viennese medical thought in his day was largely influenced by the studies of Rokitansky, the greatest student of gross pathology. It was the age of anatomic pathology: Rokitansky in Vienna and Virchow in Berlin were the two greatest pathologists in the world, and their influence was felt everywhere. In every branch of medicine changes in anatomic structure, both gross and microscopic, were made the basis of classification. It was natural for students of infant feeding to apply these principles to their work. They attempted to find for every clinical picture anatomic changes in the organism, and Widerhofer's classification is almost entirely an anatomical one. In Gerhardt's Handbook of Diseases of Children, published in 1880, he writes a very complete chapter on gastrointestinal disease in babies, from the standpoint of a pathologist. He recognizes innumerable pathologic conditions, each of which he believes has a corresponding clinical picture.

Some of his main divisions are as follows:

1. Acute gastritis.
2. Chronic gastritis.
3. Dilatation of the stomach.
4. Toxic gastritis.
5. Melaena.
6. Dyspepsia.
7. Enteralgia.
8. Acute and chronic enterocatarrh.
9. Follicular enteritis.
10. Membranous enteritis.
11. Croupous and diphtheritic processes.
12. Syphilitic enteritis.
13. Amyloid degeneration.
14. Cholera infantum.

Such a classification as this is very unsatisfactory, as it does not sufficiently take into account the processes which have produced the pathologic picture. Furthermore, in many of the severest types of gastrointestinal disturbance in babies there are no pathological lesions that can be demonstrated, either in gross or by the microscope. The changes are largely of function rather than of structure. Widerhofer's classification lasted some time, however, and traces of it are still to be seen in several modern textbooks. Most authorities are agreed, however, that the viewpoint of anatomical pathology is not the best one to adopt in considering these disturbances.

Escherich. No consideration of the development of infant feeding would be complete without reviewing the work of Theodore Escherich, although he proposed no new system of feeding or of classification. In his day (1886) the science of bacteriology was in its infancy, and he was the first to study carefully the bacteria in the infant's intestine, and to show the significance that they had in the normal and abnormal intestinal processes and their relation to food in the intestines. He investigated the normal intestinal flora, and showed that it was of two sorts, the fermentative and putrefactive. He showed how the bacteria are necessary for the normal functions of digestion, and how they may cause trouble. He was the first to see clearly that there are two processes going on in the intestine: putrefaction of protein and fermentation of carbohydrate, and he laid down the great principle that the types of bacteria that exist in the intestine are dependent upon the kinds of food fed. That high carbohydrate feeding favors the growth of one group of bacteria, that high protein feeding favors the growth of another group, and that if one type predominates and if the excessive breaking down of either carbohydrate or protein results, the baby gets into trouble. He recognized the fact that when carbohydrate fermentation exists carbohydrate should be withdrawn from the diet, and protein substituted, to change the type of intestinal flora, and vice versa. This is a fundamental principle which cannot be neglected in infant feeding. Indeed, I do not believe it is exaggerating to say that in dealing with abnormal intestinal processes it is the most important principle of all, and nobody can feed babies successfully without taking it into consideration. Bacterial processes in the intestine, and their relationship to the food supply can never be separated from questions of practical infant feeding, either normal or abnormal. In Escherich's own words, "The fact that through designed changes in the food supply the character of the bacterial vegetation, and all the processes that go with it, can be altered, opens to us a broad and remunerative perspective, and in order to apply our knowl-

edge of intestinal bacteriology practically the first and most important thing is a thorough study of bacterial processes in the *normal* intestine. May the views put forth here not be without practical value in the treatment of that murderous pestilence of the first year of life—diarrhea."

Czerny and Keller—(The Fat Period; about 1900—). Previous to Czerny, as we have seen, much had been accomplished in the study of the baby's food of intestinal bacteria, and of the pathology of the intestine; attention had been focused either on the food before it was given to the baby, or on the digestive processes in the bowel; not enough had been given to a consideration of the baby as a whole, and the effect of the different food elements in normal and abnormal conditions upon the general metabolism. It remained for Czerny to take a broader view, to suggest the term "disturbances of nutrition" instead of "gastro-intestinal diseases," and to follow carefully the etiological influence of the various food elements in causing these disturbances. "A study of the general metabolism allows us to follow the fate of the foodstuffs after they have passed through the digestive tract and the influence of unsuitable nourishment upon the whole organism of the infant. Metabolic studies do away with empirical methods of feeding."

Czerny and Keller's monumental textbook on infant nutrition appeared in several parts, the first part coming out in 1906. It is really a marvelous book, showing a broad knowledge and a great power of putting together facts and theories to make a harmonious whole. The style is remarkably clear for a German book, and ideas are expressed with a conciseness and freedom from pedantry that is quite unusual in such a work.

Czerny and Keller's classification of nutritional disturbances is an etiological one, and was undoubtedly the best that had appeared up to that time. They divided nutritional disturbances into three broad groups: (1) from food, (2) from infection (3) from constitution.

In the first group comes (1) fat injury, (2) starch injury, (3) gelatine injury, (4) scurvy.

They describe with great clearness the picture of fat injury (Fettnährschaden) and consider it one of the most important of all food injuries. It arises from overfeeding with fat, is evidenced by constipation, pallor, loss of turgor, and failure to gain. They consider fat the most important of all the food elements in causing nutritional disturbance.

Starch injury (Mehlnährschaden) comes from a one-sided starch diet in the first few weeks of life especially. The baby is much emaciated from lack of nourishment. He has had just enough starch barely to keep him alive, but no more, and his body cells are dying from lack of salts and protein. Thus we see the results of the food injury extending beyond the intestine and affecting every cell in the body; a true metabolic disease is present, and not a mere "indigestion."

Czerny also attacked the old supposition that protein was the most important cause of digestive troubles. He believed it did practically no harm, and did not recognize any such thing as protein injury in his group of food injuries. This was revolutionary, as previous to him attention had been focused on the protein, and all the attempts in milk modification had one particular end in view, to make it of easy digestion. He says, "There is no single symptom which can show us injury to the infant through protein, and from the standpoint of the clinician it is impossible to speak of a protein injury. It is possible that with abnormal flora in the intestine, putrefaction of the casein *might* occur. It is, however, as yet unknown whether or not this actually does happen; and, furthermore, if it should occur, whether or not it has anything to do with nutritional disturbances. In overfeeding with milk in our experiences, a fat injury, and not a protein injury occurs. Overfeeding with protein is hardly possible—it is much more likely that in an artificially fed baby there should be protein underfeeding. We cannot take into consideration a disturbance of nutrition from protein."

Disturbances of nutrition from infection include all conditions which might be caused by bacteria or their products. (1) Infection of the food before it enters the body in such a way that toxic products are formed in it. (2) Infection of the food in the intestine. (3) Infection of the intestinal mucosa itself. Alimentary intoxication is a condition in which the symptoms are caused by the toxic products of destroyed food: in enteral and parenteral infections, the trouble is caused by the bacteria

themselves attacking the body; in the former group by infecting the intestinal wall; in the latter group by infecting other parts of the body and causing gastrointestinal and nutritional disturbances secondarily. There are two types of alimentary intoxication: one in which chiefly sugar is being decomposed; one in which the fat is. Fever in these conditions means an injured intestinal wall which makes it permeable for bacteria or their toxins, and very small injuries to the intestinal wall may allow this. The acids from fat or from carbohydrate decomposition are the starters of the trouble in alimentary intoxication. These may be introduced in spoiled milk or may arise in the gastroenteric tract from bacterial decomposition of food. The symptoms of intoxication have many causes, of which only a part are as yet known. It can be assumed as true that a part of the symptoms are caused through water and salt loss, another through the absorption into the body of toxic material from the intestine which could not normally pass the intestinal wall, and finally acidosis must be taken into consideration. Special toxins have as yet not been discovered. Special toxins are not necessary, however, to explain the clinical picture, as nearly all the symptoms are dependent upon disturbances of the intermediary metabolism which are brought about by the pathological processes in the digestive tract.

As to milk modification, Czerny recommends simple milk dilutions with addition of carbohydrate—1/3 milk, 2/3 water for a baby in the first few weeks; then 1/2 milk, 1/2 water; later, 2/3 milk, 1/3 water, and finally about the eleventh month, whole milk. He does not believe in the use of cream in any way, as it is likely to cause fat injury.

We owe to Czerny the first really adequate study of the nutritional disturbances, and the most comprehensive classification of them that had yet appeared.

Finkelstein. The teachings of Finkelstein and his co-workers, Langstein and Meyer, began to come into prominence about 1907, and from then up to the present time have received a great deal of attention. Finkelstein's chief contributions may be summed up in four phrases: sugar, salts, clinical classification and protein milk. Sugar had been, before his day, comparatively neglected as a source of digestive and nutritional disturbances; he makes it the cause of most of them. He studied carefully sugar fermentation in its different degrees, and the results of sugar fermentation, both immediate and remote. Sugar fermentation can be brought about in many different ways, but it is most likely to ferment in a medium which is rich in whey salts, particularly sodium salts. It is the whey salts of cow's milk which are injurious, and not the protein. The whey salts depress the antibacterial function of the cells of the small intestine and thus allow too profuse bacterial growth and consequent fermentation of the sugar. The intestinal mucosa is impaired functionally by the acids which are formed from sugar fermentation, and this functional injury allows the salts and unaltered lactose to pass through it into the general circulation. Finkelstein at first thought that the lactose was the cause of the fever and symptoms of intoxication which occur in some of the more severe cases of sugar fermentation, but later changed this view, and came to regard the salts as the cause of fever. Bacteria and bacterial toxins he does not consider important, except as they are concerned in the original fermentation. His new and startling ideas concerning the salts have caused a good deal of discussion, and have stimulated much research, some of which is in accord with his views, some of which is not. Protein never does any harm, and fat is harmful only when there is a primary sugar injury; sugar is the one particular thing that causes trouble for babies. Thus we see that every food element in its turn has been considered the chief offender—with Biedert, Rotch, and Meigs the protein, with Czerny the fat, and lastly, with Finkelstein, the sugar and the salts.

Finkelstein's classification of nutritional disturbances was likewise different from anything that preceded it. He sees these conditions with entirely new eyes, and builds up a most ingenious edifice in his classification and treatment. His classification is purely clinical; he recognized and studied carefully certain conditions that babies get into through errors in digestion or nutrition; the etiology of those conditions is a secondary consideration. He says, "An etiologic diagnosis I hold to be practically impossible and if it were possible—not desirable. How little, for example, does the diagnosis "nutritional disturbance from infection" mean, when it remains in the dark where the origin

of the condition lies, whether from secondary dyspeptic fermentation or other causes. It is best to discard all etiological nomenclature and to adopt the clinical; it is desirable for the physician to be able to say what sort of child he has before him and how this child will react to definite dietetic influences." He admits himself that his classification is by no means perfect, and doubts whether there ever can be an absolutely satisfactory classification, as many of the various disturbances shade into one another so closely that it is impossible to separate them thoroughly. To each food of a certain composition there belongs a certain type of disturbance, and there must be as many types of disturbances as there are combinations of food elements.

His four main clinical groups are as follows: (1) Disturbed balance; (2) dyspepsia; (3) intoxication; (4) decomposition. By disturbed balance he means especially the fat injury of Czerny. A baby has previously done well despite adequate or over adequate caloric intake, does not gain, or may actually lose. Instead of a gain of weight resulting from an increase of food a loss is likely to result (the "paradoxical" reaction). The food which brings about this disturbance is usually a food rich in fat and protein and relatively poor in carbohydrate; according to Czerny, overfeeding with milk; according to Finkelstein, underfeeding with carbohydrate. His principles of treatment are essentially the same as those of Czerny; reducing the amount of milk and adding carbohydrate in the form of maltose and starch.

2. Dyspepsia is the milder form of sugar fermentation. In this condition the process is localized in the intestinal tract, the loss of weight is not large and there are no symptoms of intoxication; the baby as a whole does not suffer, nor are there serious symptoms unless the condition is untreated or treated wrongly. Dyspepsia is likely to arise from food rich in sugar and whey salts; is favorably influenced by a food low in sugar and high in protein.

3. Intoxication represents a severe metabolic disturbance. It may have started as a dyspepsia, or may be engrafted onto a decomposition. The process here is not localized in the intestine, the whole organism suffers; the child's body is in a state of "metabolic bankruptcy," there is chaos where there should be order. The temperature is high and the baby's general condition bad. The baby is losing nitrogen, water, and salts, and there is likely to be considerable acidosis present. The fever, and most of the untoward symptoms are caused by the whey salts, which have gone through the unhealthy intestinal mucosa into the general circulation. The prognosis is grave. This is the condition which Czerny also describes under the head of alimentary intoxication, although he does not believe it is due to as specific causes as does Finkelstein. He believes it is a resultant of several conditions, many of which we know little about.

4. Decomposition represents what was known to the older writers as "marasmus," "athrepsia," or "infantile atrophy." The condition may arise in a number of ways, either as a result of a prolonged "balance disturbance" or a chronic dyspepsia, from an improperly treated intoxication or from prolonged underfeeding or improper feeding. The chief thing about decomposition is the very low tolerance for food; increasing it beyond the limit of tolerance may result either in dyspepsia or intoxication. The baby's body is actually decomposing, every cell in the body is affected, and the organism is not able to assimilate food, even if the digestive processes in the intestine were not impaired.

In order to treat sugar fermentation Finkelstein desired a milk preparation very low in sugar and high in protein. The purpose is to inhibit sugar fermentation by withdrawing the fermenting substance, and to change the bacterial flora of the intestine from carbohydrate splitters to protein splitters by offering a low carbohydrate and high protein food; to promote an alkaline instead of an acid intestinal contents. For this purpose he devised the famous "eiwess" or protein milk, a preparation containing fat 2.5%, sugar 1.5%, protein 3.5%. This was made from equal parts of buttermilk and water to which a certain amount of finely sifted milk curd has been added. The principle of protein milk feeding is undoubtedly one of the most important advances ever made in infant feeding, and pediatricians all over the world have become convinced of the worth of Finkelstein's milk or modifications of it. Used in the right type of case, it is without question remarkably efficacious, but like all good things it has been used too much, and in cases in which there is no possible indication or need for it. It is not a universal food for all feeding

troubles, but is merely one more very excellent weapon added to our armamentarium.

As does Czerny, Finkelstein recommends simple dilutions of whole milk for feeding most babies, and following him, this method of feeding is used by most of those who have studied in Germany. It has the advantage of simplicity, but does not offer the wide variety of choice in the various combinations of the food elements that the older methods of cream dilutions and cream and skimmed milk modifications do. In the last ten years the influence of Finkelstein has been profound, and it is probable that his teachings are followed more than those of any other authority at the present time.

What conclusions may be drawn from this brief résumé of these various stages in the development of infant feeding? Can we believe that we in the present epoch are entirely right, and that our predecessors have been wrong? This is hardly reasonable, and yet each epoch has been insistent that its ideas are the best, which is only natural. Any period in the development of any human activity is at best only a station along the road of progress, and as research advances many of the old ideas are discarded, some retained and some modified. Any period in the development of any science always owes most of its ideas to the thought of those periods which have preceded it. This is particularly true of infant feeding. There has been in infant feeding no one startling discovery, such as has occurred in most other branches of medicine; its progress has been rather in the nature of a gradual development, and it is still in the developmental stage. When we realize that most of what we have come to believe as true regarding infant feeding has been developed in the last fifty years, it is not difficult to grasp what enormous changes may take place in the next fifty. We are at present in a period —the period of sugar—we have gone through the period of protein and of fat. As we learn more our present ideas will undoubtedly change and the infant feeding of 1950 will probably be little like that of 1920. Whatever classification we use, whosever teachings we adopt, we must realize that there is more than one way of looking at the subject. If we adopt Rotch's teachings, Finkelstein's need not necessarily be wrong; or, if we accept Finkelstein's Czerny's need not be considered erroneous. Rotch's postulate of knowing approximately the percentage composition of the food we offer, and expressing our milk modifications in terms of percentages of the food elements, can perfectly well be combined with the teachings of Czerny and of Finkelstein, and should be.

Something has been gained, something has been added to the whole, by each of the various periods, and the teachings of all these different men are not incompatible. Czerny's classification is excellent, so is Finkelstein's; babies undoubtedly do suffer from fat, likewise from sugar. Some things are not sound in the teachings of either; these will soon be discarded and the good points will remain. Much of Rotch's teachings we do not agree with today—but his main principle, that we must have some method of feeding which will allow us variation in dealing with the individual, some method by which we can express accurately and concisely to others what combination of the food elements we are feeding to any given baby, will always remain. This principle is absolutely sound, and cannot be passed over. It is a pity that European students have not paid more attention to American methods, and it is rare indeed to see a reference to the name of any American author in a German textbook. We in America are far ahead of any method that Europe has yet produced in the modification of milk. European students are far ahead of us in the study of the normal and abnormal chemistry of the baby. As I said before, studies in this country have dealt chiefly with the baby's food and how to prepare it; German studies chiefly concern the baby himself. German methods of milk modification have little elasticity; their whole milk mixtures are, in many cases, quite inadequate. We can learn much from them, however, concerning abnormal processes in the baby, concerning the pathogenesis of the digestive and nutritional disorders, and we should combine our own ideas of milk modification with their ideas of the baby. There are too many practitioners in this country who feed blindly; they have not the remotest idea of the underlying reasons for their procedures, and we can arrive nowhere, no matter how carefully our milk modifications are prepared, or our percentages calculated, unless we understand the fundamentals of the science of nutrition, the digestion and absorption of the foodstuffs, their influence upon each

other and the influence of the intestinal bacteria upon them all.

Different sections of the country use different methods and look at feeding problems somewhat differently, despite all that has been written, "that we all feed the same." We do not all feed the same, and probably never will. In the last few years many American pediatricians, particularly from the middle West, have studied in German clinics, have brought home the German ideas and have taught them in the medical schools. Followers of these methods have been rather inclined to look down on the older methods of "percentage feeding," and those who have been brought up in the old methods have given in many cases little heed to the new. The younger disciples of the German school have not investigated carefully enough the teachings of the older American authorities, nor have many of these older American authorities paid much attention to the newer German ideas. The two should be combined; German chemistry, American milk modification. More good research work in problems of infant nutrition is being done in this country than ever before, however, and it will undoubtedly be productive of much good. We owe to German investigators most of what we know regarding the baby's normal and pathological chemistry; we owe to American investigators most of our knowledge regarding modifying cow's milk to make a suitable food for him. I cannot believe in the exclusive use of whole milk mixtures (the German drittel milch, halbmilch, and Zwei drittel milch) as practiced at present in many parts of the country, and feel certain that for general use better results can be obtained with more elastic methods, which will allow more variation in the relationship of the food elements to one another. Many babies can be fed, and fed successfully, on whole milk dilutions from the time of birth onwards, but in many cases we need combinations of the food elements that no whole milk dilutions can supply. Any experienced pediatrician uses all the methods of milk modification, however; he knows what combinations of the elements he wants and gets these in a simple way, if possible. If not possible in a simple way, he turns to other methods. No infant feeder of experience sticks to one method of milk modification exclusively, any more than any internist of experience has one routine method of treatment for any given disease that he may be dealing with. Infant feeding need not necessarily be made abtruse and complicated, but it must not, on the other hand, be made too superficial. *The practitioner must know his food elements and be able to trace them in their progress through the digestive tract; he must also have several methods of milk modification at his command, so that he can combine these elements in any way he desires to meet special indications; the various milk preparations and methods of milk modification are the "tools of the trade," as Dr. Rachford of Cincinnati has aptly said.* Whatever we believe about the various food elements, we must realize that most of the time it is not exclusively one food element that causes trouble; it is rather improper combinations of the elements. We may be able to feed a baby successfully on a high fat and low protein, but as soon as we employ a high protein and high fat we may begin to get trouble with the fat digestion. Large amounts of one element may be handled well by the baby, large amounts of two or more elements usually get him into trouble.

I can conceive of only two reasonable methods of classification, the etiological and the clinical. Whichever we follow we must realize that the other is not necessarily wrong; it is merely another way of looking at the same phenomena; a difference in nomenclature rather than in actuality. My personal feeling is that the etiological nomenclature is the more satisfactory, despite certain disadvantages; there are many, however, who would not agree with this. This nomenclature is advantageous in that it makes us think especially of the various elements and what they can do to the baby; it is dangerous in that it has a tendency to focus itself upon one element to the exclusion of the others, and it unquestionably does not describe the various conditions in which the baby may be, as well as does the clinical nomenclature of Finkelstein. There is no question but that at the present time Finkelstein's teachings are influencing infant feeding more than those of any other man or group of men. Many of his ideas will last, but a good many will undoubtedly be discarded as further progress is made. There is no telling what the next generation will bring forth, but judging from past history, our ideas concerning infant feeding then will bear little resemblance to our ideas

now; in such a young science there is possibility of infinite change in the next few years. The salts and their relationship to the other food elements, their influence upon digestion and upon cell metabolism seem to offer the most fertile field for research and progress.

Realizing that we have by no means as yet reached the solution of the problem, we must be broad minded, must keep away from fads, must not focus on one point to the undue exclusion of others, must accept the fact that there is more than one way of looking at this most interesting subject, be not too assertive and dogmatic in our statements, and remember that what is apparently true today may be proved false tomorrow.

ANESTHESIA IN OBSTETRICS.

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In the surgery of this generation, the selection of an anesthetic and the mode of its administration has become an important factor, not only for the comfort and safety of the patient, but also for the very material assistance to the surgeon whose results and technique are invariably better when an anesthetic is properly given.

Anesthesia in obstetrics is becoming equally important, and its use more and more common. It is the purpose of this paper to discuss the desirability of an anesthetic in this class of cases together with the selection of the anesthetic used and its method of administration.

There are two factors which are leading to the use of anesthetics in obstetric cases. First, obstetricians are beginning to realize how much a properly given anesthetic really aids in safe delivery and the added facility in the management of the case; second, the general public is demanding relief from the pain and distress of labor as far as that can be prevented. What used to be a luxury to the average patient is now a necessity.

The reasons for this new need are indefinite. Is labor today more painful than it was fifty years ago in the average case? We hear all sorts of answers to such a question. The modern patient is perhaps not as well fitted to bear the same amount of pain as her ancestor, and we have now the well established fact that continued poorly borne pain leads to true surgical shock. Weighing these facts, is it not true that the resultant shock which is so commonly observed after a long difficult labor, is more dangerous to the patient than a carefully administered anesthetic? Physically, women of today may be equally well fitted for child bearing to the women of several generations previous to ours, but mentally they are not. A few years ago there was no pre-natal care, no pelvimetry and no sphygmomanometer. These instruments have led us to observe abnormalities which could not have been recorded in the past. They have warned us of disaster ahead, much of which is preventable, but they have neither increased nor decreased the pain of the average pregnant women who deliver themselves.

An anesthetic, however, not only relieves subjective pain and its resultant exhaustion and shock, but greatly conserves the nervous expense to the patient, allowing for better controlled energy and better trained use of her expellant powers. The patient who is exhausted by the nagging pain of a prolonged first stage of labor cannot meet the second stage suffering with the nervous equanimity and determined effort as of the patient who has had help in the first stage and knows that she may have more help as labor progresses.

In an effort to give the patient an ideally painless, or nearly painless, labor, many soporific and anesthetic drugs have been used, and each one in its turn has been equally disappointing. The reason for this is the quite different situation between the ordinary surgical case and the ordinary obstetrical case.

In surgery, the patient is anesthetized for a relatively short time,—rarely over two hours. Complete relaxation of all muscular rigidity is highly desirable. There is but one patient at a time to consider. The surroundings are generally ideal. The anesthetic is easily given, for the patient goes under its influence and remains so until the completion of the operative measures. A little deeper or a little lighter anesthesia makes no difference in the procedure of the work, so long as muscular relaxation is obtained. In fact, a practically perfect anesthesia,—from the surgeon's point of view,—may be given by an inexperienced and quite untrained anesthetist. But we are more and more

realizing that the patient should have the benefit of a trained specialist in this field as well as a skillful surgeon.

In obstetrics there is a much more complicated series of problems presented by the desirability of using an anesthetic. The anesthesia must be over a long period of time, often non-continuous but intermittent. If pushed to the stage of muscular relaxation, it may be a complete failure if the progress of labor is lost. There are two patients' lives to be considered,—mother and child. The surroundings are often far from ideal. The degree of anesthesia must be perfect; a little too light,—and the patient has pain, real pain; a little too deep,—and the forces necessary for delivery are inhibited. That means skill on the part of the attendant, perfectly working mechanical apparatus, and conscious coöperation from the patient. A difficult combination, but, as we shall see, a possible one, and precisely attained by attention to details of technique.

The advantages which must be attained in an anesthetic suitable for obstetrical work are as follows:

1. Relief of pain.
2. Safety to the mother.
3. Safety to the child.
4. Safe and capable of administration over a long period of time.
5. Safe and capable of administration intermittently.
6. Comfortable for the patient, that is without side action of nausea, vomiting, or other toxic manifestations.
7. Simplicity of apparatus, easily portable.
8. Low cost.

Take away any of these desirable features and the practical value of any anesthetic is *nil* in confinement cases.

There is no single drug useful for anesthesia which combines all the features that are ideally desirable in this work, certain anesthetics having glaring disadvantages which relegate them as absolutely undesirable. Others have their minor disadvantages which partly reduces their efficacy in obstetrics. The selection must obviously be made of the anesthetic or combination of anesthetics which have the most essential features and the least important disadvantages.

Ethyl ether relieves pain according to the degree to which the anesthetic is pushed, but when complete relief is obtained, there is total muscular relaxation, and that, in obstetrics, means inhibition of uterine contraction. There is, however, a happy medium of administration easily obtained, where the patient's expulsive power is not seriously diminished, but her suffering is greatly, although not entirely, relieved. In fact, this degree of etherization is commonly spoken of as the obstetrical degree. Ether is absorbed through the alveolar lung surface with moderate rapidity. It is excreted slowly through the lungs. It embarrasses foetal respiration to some extent, and is not, therefore, safe when used over a considerable length of time. Children are born anesthetized, which adds to the difficulty of resuscitation. Ether is irritating to the kidney tissue, and is quite unsuitable in the presence of organic renal disease of the mother, or of the severer forms of toxemia. It has an unpleasant side action resulting in nausea and vomiting in a large percentage of patients.

When pushed to the surgical degree, it is a most satisfactory all around anesthetic for operative work where muscular relaxation is essential.

Chloroform is much more easily absorbed and is excreted with much greater rapidity than ether. It is, therefore, preferable for intermittent anesthesia. It has the advantages of being pleasanter to take by the average patient, and rarely produces nausea and vomiting. The margin of safety between the stage of anesthesia and respiratory paralysis is very small and its administration must be in the hands of a careful, painstaking expert anesthetist. It is equally dangerous to the foetus and the mother, and the element of danger is enough to discard it for general use. True, it is used in certain communities and by certain physicians who report unfailing success. Suffice it to say that results do not sufficiently justify its use in the well known clinics of the country where safety and good results are paramount.

Nitrous oxide gas relieves pain without inhibiting the force of uterine contractions. In fact, there are experimental evidences which indicate that the gas stimulates smooth muscle to contract and therefore uterine activity, resulting in shorter labors. It is very quickly absorbed and is as rapidly excreted as the expiration rate allows. It is comfortable for the patient, and rarely produces nausea or vomiting.

Alone and in inexperienced hands it is dangerous for both the patient and her baby, for respiratory paralysis takes place suddenly and without the slightest reliable sign if too much is given. Combined with air, or better still, with pure oxygen, it is safer, and can be given either continuously or intermittently over a long period of time without harm to the mother or embarrassment to the foetus. Its main disadvantage is the bulky complicated apparatus which is required and the cost of administration. In the past, its use has meant the employment in every case of a competent anesthetist. Recently, however, through the ingenuity of manufacturers, a simple and highly satisfactory device has been developed which allows for self-administration by the patient with perfect safety. This element of self-administration is of vast importance and marks an advantage never before satisfactorily accomplished. After all, the patient herself knows more than any observer how great is the pain, and she is, therefore, the best judge of how much relief she actually needs for that pain. This is not only true throughout an entire labor, but also for each uterine contraction, some of which are wholly bearable even to the most neurotic individual, while others are wholly unbearable to the patient of exceptional fortitude. Further, patients appreciate their own ability to regulate the anesthetic according to their desires, rather than to have their consciousness subject to the will of another. Nitrous oxide can be given from the first pain of the first stage of labor to the last pain of the second stage of labor. It is equally available for immediate perineal repairs, manual detachment or even the Crédé manouver for placental adherence. For extensive operative work, such as version, forceps or breech extraction, it is practical when given by an assistant.

A further advantage when oxygen is available, as it is in all modern gas apparatus, is in the resuscitation of the new-born infant, whether asphyxia is due to anesthesia, compression of the cord, or long difficult operative cases. Before the cord is cut, oxygen is freely administered to the mother, the oxygenated blood passes to the child through the placental circulation. The result even in pallid asphyxia is spectacular.

Morphine, scopolamine, chloral, and drugs of a similar nature have all been used alone and in combination. They have one serious disadvantage. Once given, their rate of absorption varies with patients and their rate of excretion is equally uncertain. A dose of morphine may have had its therapeutic action on the patient but still be active in its effect on the baby. Give another dose to the patient and we get a summation, amounting to a toxic dose on the foetus. We would not give a new born child a hypodermic injection of morphine even of an amount appropriate for a child; why, then, give it a dose into its blood stream of adult size? Of scopolamine and chloral the same is true. But even if we discount the effect on the child, these drugs are not only not practically efficient in relieving pain for so long a period as the average labor, but therapeutically wrong on account of our utter lack of knowledge about the individual idiosynerasy of the patient, and the most important of all, the indefinite time of excretion. The first dose is not excreted by the time we must give another. Toxic action is still going on and may lead to acute poisoning. These drugs are useful, of course, as drugs, but not as anesthetics. They serve to give the patient a temporary, anodyne effect in those cases where the progress of labor is slow and when the patient is becoming exhausted by her efforts. Temporary rest will allow her to recuperate her powers for a renewed energy.

The sudden enthusiasm recently for the so-called "Twilight Sleep" is the result of somewhat injudicious lay articles in popular magazines. The use of scopolamine for the relief of child-bearing pain is not a new idea. Many years ago it was tried by a number of very competent obstetricians in Boston, New York, and Chicago. Sane reviews of their results does not justify its general use and the experimenters themselves have long since discarded the drug as dangerous because of its toxicity to both mother and child. Under the influence of twilight sleep babies are almost universally born in a state of livid asphyxia. Foetal mortality is high in Gauss' Clinic at Freiburg, where it has been so extensively used. There are physicians today who are using this method and claim splendid results. The result is not anesthesia or analgesia, but narcosis. It does not relieve pain, but the patient is so thoroughly saturated with the drug that she forgets the pain after recovery. Morphine, scopolamine,

and similar drugs unless given in toxic and therefore dangerous doses, are not enough relief to the patient. When given in toxic doses they are not safe enough to run the chance, especially when safer and more efficient methods may be used. A further point in their use lies in the fact that they do not keep the patient quiet. She tosses around in her pain, and that restlessness seriously interferes with the proper management of the case. A single false move may ruin all the barriers of asepsis which have been perfected to protect her. The patient is practically drunk. Painful impulses are received and recorded by the brain and cord, but result in incoördinate and inappropriate motor replies.

Regional and spinal anesthesia have been tried with various results. Their chief difficulty lies in untoward side actions such as nausea, vomiting, headache and muscular pains. Local anesthesia applied to the cervix and perineum give splendid results as far as they go, but it is obviously impossible to cocainize the entire birth canal practically. It is not improbable that this method will some day be revived with success, given the proper apparatus and technique.

This brief, rather generalized review of the pharmacological properties and clinical action of the several substances available for obstetrical anesthesia, logically leads us to the conclusion that there is no single drug ideal for the purpose. Each has its advantages and each has its dangers. Many of the possible combinations are equally unsuitable. There is, however, one combination that while not ideal is sufficiently useful in producing the desired result,—freedom from pain throughout labor, and with as much safety as the average surgical etherization. This combination is nitrous oxide gas, oxygen and ether. It may be used with equal success for the long tedious primiparous labor, the short multiparous relatively easy birth, the labor attended by toxemic complication, even convulsions, and all of the minor and major operative obstetrical procedures. It is efficient, relieving pain. It is safe in moderately well trained hands, it is useful. The technique is simple, and may be managed by the patient of average intelligence without the absolute necessity of an anesthetist.

The method of administration and the clinical picture of its use is as follows. In the early part of the first stage, no anesthetic is necessary except in the extremely neurotic patient. Its use then should not be encouraged, but it may be employed if need be from the very first pain. In all cases, as the pains progress it is a good plan to begin the use of light anesthesia, or better, analgesia. At the very first indication of a contraction, the patient puts the mask over her mouth and nose and inhales in rapid succession three times, taking full breaths of undiluted nitrous oxide. She then holds her breath, until the contraction is subsiding. With the first breath her only sensation is one of the sweetish odor of the gas. With the second breath, she gets a tingling sensation, and the pain of contraction is just barely noticeable. With the third breath, there is a complete numbness, although the patient is clearly conscious. She holds her breath and the numbness is modified by a sense of warmth, or, as she will say, "a glowing sensation." This generally lasts as long as she can conveniently hold her breath; during the time the uterus has shown no sign of abating its power, but has undergone a strong clinically normal contraction. By the time the patient is ready for a breath of air, of her own volition, the pain is petering out. She is slightly dazed, but almost immediately recovers her full consciousness. She has been in complete possession of all of her faculties, can hear and comprehend what is said to her or what has been going on around her, and yet like a dream there has been no physical suffering.

Physiologically, at the first breath, she inhaled a combination of gas and air; and on the second and third breaths, pure gas. The gas was absorbed by the blood stream and eventually carried to the uterine wall. As it reached the uterus, that organ was in a state of contraction, which means that all of the blood vessels in its walls were squeezed and constricted by the surrounding smooth muscle fibres. Such pinching of the vessels mechanically prevents to some extent the full discharge of gas laden blood into the foetal circulation by the temporarily restricted placental interchange. Such a delicate physiological mechanism in part accounts for the lack of anesthetization of the unborn child, as contrasted to that when the gas or any other anesthetic is used continuously.

With three such inhalations as have been described, the majority of first stage pains are

relieved for the patient completely, although uterine contraction and resulting progress are not inhibited. As the pains increase in intensity with the progress of labor, it is necessary for the patient to take more gas. By a sort of natural selection she soon learns to take more or less gas by inhaling more or less times, according to the sensation of uterine contraction. This sensation is almost intuition, and after a few times the patient will gauge the amount of anesthetic necessary to keep her comfortable, with a nicety impossible for an anesthetist to attain.

If, during the periods of analgesia, the patient exhibits any cyanosis, the apparatus can be adjusted to admit more air or pure oxygen. This will safely permit of analgesia, or, if necessary, anesthesia for each labor pain until the so-called perineal stage of delivery. It may go on for hours. I remember one patient who took the gas herself at periods of every three or four minutes during an entire night,—ten hours. At the end of that time the foetal heart was as regular and of as good quality as at the onset of labor. Of course, between the pains, the patient is completely conscious. She can converse rationally and is cheerful. I have seen a patient in the early part of the first stage walk around, and at intervals of eight to ten minutes, sit in a chair and take a little gas for each pain. Of course, such a procedure would not be safe unless light analgesia were taken. In the case cited, the patient was using only the lightest analgesia, and I am frank to admit that there was undoubtedly more psychic effect than anything else. Later on, however, she had the benefit of intermittent anesthesia, self-administered, and delivered easily and comfortably.

The whole secret of the technique is to teach the patient how to use the apparatus, and to teach her to begin the inhalations at the first indication of an approaching contraction. She must work rapidly. A few seconds' delay will mean that at the height of the pain she has not yet absorbed enough of the gas to gain the desired comfort. A few seconds too early and she is out of the analgesia before the pain has died down. If she takes enough gas the stage of complete anesthesia occurs rapidly. There is a complete loss of consciousness, and she cannot comprehend any more than an etherized patient, her voluntary muscles relax, and automatically the inhaler drops from her face, and she breathes air. Strangely enough, the uterine muscle does not relax, but its tone and strength are maintained, with real progress in expulsion. By the time the patient is conscious again, even the prolonged agonizing pain of late second stage labor has abated for an interval.

In nearly every case, when the delivery is at hand and the perineum begins to bulge, the gas is not enough. Then there must be an admixture of ether. This does not mean a substitution of ether but a true mixture of gas and ether, without or with oxygen. Complete etherization is unnecessary and inadvisable. A small amount, rarely over two fluid ounces, will suffice, added to the nitrous oxide, to completely anesthetize a patient for delivery, even when preceded by episiotomy. The addition of the ether means in most apparatus simply turning a valve, and holding the mask on the patient's face. Naturally anesthesia cannot be continued by the self-administration method. At that time a nurse who has previously received the few necessary words of instruction can safely turn on the ether and satisfactorily conduct the anesthesia for the few moments needed for delivery, without any necessity for the accoucher to break his asepsis.

As soon as the baby is born, ether and gas are turned off, the inhaler removed from the patient's face for a moment, and pure oxygen blown through it to remove all traces of the anesthetic. Then it is replaced on the patient's face and a few inspirations of the oxygen undiluted will not only result in removing all signs of asphyxia in the baby and stimulate normal respiration, but will usually revive the mother to dazed consciousness. In those cases where immediate repair of the perineum is indicated, the patient can take a few breaths of the gas for each suture, and that will make the operation painless without excessive delay. In a like manner, the Crédé method of placental expression or even manual detachment can be similarly done without discomfort. In the truly operative cases, such as breech extraction, version, or forceps, naturally the case approaches in its features any surgical operation. Ether is then the anesthetic of choice. Gas oxygen is available and may be given, if ether to a surgical degree is contraindicated. But operative deliveries usually fol-

low long hours of preliminary labor and its attendant pain. If gas has been used, the patient is in much better condition for the operative work than otherwise, and she takes the ether sequence with more equanimity and with less physiological disturbance.

The cost of this method of analgesia and anesthesia varies with the case. Some patients are inclined to use more gas than others. The longest case I remember is one in which over a period of nearly 28 hours the gas was used discontinuously and gas oxygen had been used for inserting Voorhees bags on two occasions. The case finally came to operative delivery, with gas and ether. In all, 300 gallons of gas and 40 gallons of oxygen had been used at a total cost of twelve dollars. The cost of the anesthetic in the average primipara will amount approximately to seven dollars. In the average multipara, to about four dollars. In some cases it will be as low as one or two dollars. It is worth it. Patients are willing to pay and pay well for comfort, and they reappear at a later pregnancy to make arrangements for the same comfort again.

In this method of analgesia in the early part of labor, and anesthesia later, the results, excluding all other factors, are excellent. Of course, no matter how perfect the anesthetic, or how painless the labor, if the actual technique of delivery is not good, the results will be poor. Anesthesia does not make up for careless obstetrics with questionable asepsis. In other words, it solves but one fundamental problem,—that of giving modern mothers relief from the suffering of labor. I have used this method in nearly one hundred consecutive cases, some of them my own, and some of them for other obstetricians. In no case has there been difficulty in resuscitating the baby. In two, the children have been still-born, both operative cases. One was a primipara who had a central placenta praevia and suffered severe shock from a difficult manual dilatation and manual extraction. The other was a primipara in whom the forceps failed, version was performed, and for the safety of the patient, slow careful delivery resulted in compression of the cord too long for the child to be born alive. In every case, the patient has voluntarily testified to the comfort of the analgesia and almost every obstetrical complication has been met in the series.

I firmly believe that properly used and with perfectly working apparatus that nitrous oxide analgesia and anesthesia, with oxygen, and supplemented by ether in selected cases can be administered in 99% of all obstetric cases so as to give the patient a practically painless labor. I believe that this can be done at much less expense than is commonly supposed, and from the purely technical point of view, it saves nervous strain and often true shock, and greatly facilitates the general management of the case. Our patients are entitled to its comfort.

Book Review.

IV Congreso de la Asociacion Espanola de Urologica, Temas oficiales, Comunicaciones y Discusiones. Publicados bajo la direccion del DR. PEDRO CIFUENTES, Secretario General. Madrid: Imprenta Comercial. Valvarde, 21. 1918.

This pamphlet, of over four hundred pages printed in Spanish, contains the report in full of the transactions of the Fourth Congress of the Spanish Association of Urology, held at Madrid in October, 1917. It embodies the usual papers on renal, bladder and prostatic subjects, with their full discussion, and it resembles in most ways the reports of similar surgical associations in this country.

There are several excellent papers on renal tuberculosis; one on the phthalein renal test; several good discussions on the treatment of bladder tumor; and two or three studies of prostatic diseases—the pathogenesis of prostatic hypertrophy, the infections other than gonorrheal to which this organ is subject, and the syphilitic manifestations which may occur in it. There are many less pretentious papers—reports of cases, consideration of local anesthesia.

The remarks on the treatment of bladder tumors in the article by Dr. Bartrina are perhaps the most important work in the report, but his paper is illustrated by a series of sketches which would not be deemed adequate in a similar paper published in this country. On the whole the articles are of a high grade, the discussions are adequate, and the publication is clearly printed on good enough paper, and shows a proper care in its preparation.

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THE PROBLEM OF THE COMMUNITY WITHOUT A PHYSICIAN.

THERE are many small communities throughout the country that are without physicians. Some which have come to our notice have been so for three years and are without any prospects of obtaining a practitioner. Such a condition is a calamity. How to secure adequate medical attention and at the same time have it efficient is the problem which is before these communities. Physicians cannot work without adequate compensation,—just what that compensation must be depends upon the cost of living and the work required; but it is very doubtful if satisfactory medical service can be obtained unless the physician has an income of from $3,600 to $5,000 a year. Most communities can afford this amount.

While we do not approve of a "contract practice," we do believe that communities that are without medical attention should make a contract with a physician which should take the form of a guarantee of a certain salary for the year. He should be free to charge the regular fee, but if at the end of the year he has not collected the specified amount the deficiency should be made up to him. What would this mean to the community of perhaps 1,000 persons? A guarantee of $3,600 would mean $3.60 per year per individual, or in round numbers 30 cents per month, or 7½ cents per week. Any community can afford that sum. There are many capable young men who have just graduated from college who would be glad to enter into such an arrangement and who would do good work. The trouble at present is that communities wish the physicians to come to them and take all the risks of making a living, regardless of the fact that larger communities usually offer better opportunities for success.

There are in Massachusetts at the present time seventy-three towns without a registered physician. The total population of the state is estimated at 3,991,969, for whom there are approximately fifty-four hundred physicians. Boston has about nineteen hundred, or one-fifth of this number, whereas in the Berkshire regions, on the Cape, and at almost any point west of Worcester and far from a large town, the people in rural districts are forced to get along as well as they can without medical attention. The following towns are among those which have no registered physician: Acushnet, Alford, Auburn, Avon, Bernardston, Berlin, Bolton, Boxborough, Boxford, Boylston, Brimfield, Buckland, Burlington, Chilmark, Clarkesburg, Dover, Dracut, Dudley, Dunstable, Eastham, Egremont, Florida, Gill, Goshen, Granby, Halifax, Hancock, Hawley, Heath, Holland, Leyden, Lincoln, Mashpee, Mendon, Middletown, Monroe, Monterey, Montgomery, Mt. Washington, New Braintree, Norwell, Oakham, Otis, Pelham, Peru, Petersham, Phillipston, Plainfield, Plainville, Plympton, Raynham, Rehoboth, Richmond, Rochester, Rowe, Sandisfield, Savoy, Seekonk, Shelburne, Shutesbury, Southampton, Southwick, Tolland, Truro, Tyrington, Washington, Wendell, West Boylston, West Stockbridge, West Tisbury, Westwood, Windsor.

Many Massachusetts towns are without nurses. Of the three hundred and fifty-four towns in the state, one hundred and sixty-five have nursing service and one hundred and eighty-nine have none; there are thus over three hundred thousand people in Massachusetts without pub-

lic health nursing service. Furthermore, many of these people live in isolated towns to which private nurses do not wish to go. The present situation is an unfortunate one, due in part to the unsettled conditions following the war, in part to the dislike manifested by doctors and nurses toward life in rural districts, and in part to the indifference of the people in general.

That these small remote towns can help themselves has been shown by the experiment tried in Great Barrington, a small town in the Berkshires. It combined with the surrounding towns to extend the work of the Visiting Nurse Association of Great Barrington. This associa- has existed for eleven years: from eighty-nine patients in the first year, with 1140 visits made, the number has increased to 569 patients during the past year, with 4376 visits. Each town helps to support the association, making a total population of 9600. The work which has been accomplished among the children has revealed their great need of competent care; the spirit of coöperation shown by these children promises well for their future.

Small towns without medical service should appreciate the fact that a combining of effort for health and social enjoyment would so improve conditions that doctors and nurses would be willing to live in rural districts. As the Red Cross will send no nurse to a town in which there is no doctor, until physicians can live in country districts with some degree of comfort and assurance of a livelihood, that society is not available for service in those places. If our national future is to be safeguarded by preventing the development of physical disabilities among the children of this generation, it remains for rural communities, physicians, and public health agencies to coöperate in helping to solve the problem of medical care in small towns.

BOTULISM.

IN view of the recent newspaper articles describing the poisoning of persons in different sections of the country from the eating of infected olives, an article in the U. S. Public Health Reports of February 13 is of timely interest.

The cause of poisoning has been ascribed to the toxin of the *Bacillus botulinus*. This organism has been found in various food products for man and beast. It has been traced to canned beans, asparagus, corn, to cheese, sausages, and mouldy hay. The Bureau of Chemistry of the Department of Agriculture has been active in trying to remove these dangerous products from the market and to find the cause and character of the decomposition. An investigation of cases reported from Ohio, Michigan, Montana, New York, and Tennessee, showed that in every instance the cause was due to eating infected ripe olives that were packed in glass. No cases were reported from olives packed in tins. In Montana the jar contained ripe stuffed olives. With the exception of the olives eaten by persons in Tennessee and Michigan, these olives were packed by different firms. It is thought probable that the olives packed in tin may have escaped infection due to the better sterilization and sealing of tinned goods in comparison to the ordinary methods with glass packing.

The article in the U. S. Public Health Report states that the *Bacillus botulinus* has never been found in food that was not spoiled. How it gets in the food is not known. Sometimes it is found only in a few specimens of a large number of food products. It has been found in articles prepared in the careful home as well as in the factory. It is known that proper sterilization and sealing usually prevent the development of the poisonous organisms; but this process ordinarily is not perfect.

The best preventive measure against botulism is, of course, to check the sale of such goods; but considering the millions of packages of healthy food products that pass through interstate traffic, the occasionally infected article is difficult to find. The Bureau of Chemistry is limited by law to the seizure of actual decomposed or poisonous foods. Any food showing the slightest trace of unnatural odor, color, gas formation or any other evidence of decomposition should be avoided. The fatal result of a small amount of this toxin is so marked that while all spoiled food may not contain *Bacillus botulinus* it is only safe to discard any product of which one is suspicious.

DR. ORION KELLY, a practicing dentist in Winchester for 22 years, died, at the age of 44 years, on February 24. Dr. Kelly was born in Yarmouth, N. S. He was graduated from Tufts Dental School and began practicing in Winchester in 1898. Dr. Kelly was an instructor at the Tufts Dental School. He is survived by his mother, his widow, and his daughter.

MEDICAL NOTES.

AMERICAN MILITARY HOSPITAL AT VILNA.—A new American military hospital has been established at Vilna by the American Red Cross, for the purpose of demonstrating to Polish army doctors the latest developments in military surgery as practised during the war on the eastern front. Detachments of Polish surgeons will be given three-month courses of instruction at the hospital under the auspices of the University of Vilna. The courses will be conducted by Major F. Black of the American Red Cross.

INFECTIOUS DISEASES IN EUROPE.—A recent report from Warsaw announces that Poland, and, what is more, the whole of Europe, is threatened by an epidemic of infectious diseases which is sweeping westward from Russia. Typhus is spreading over the whole of Eastern Galicia and has reached epidemic proportions in Cracow. The plague has appeared at Chotin on the Dneister near the Galician border. It is believed that this wave of disease has been spread from Russia by repatriated Poles who have just reached their own country. It has been reported that there were 1,340,000 cases of typhus among Bolshevists in Russia in the six months from September, 1918, to March, 1919. During the last six months of 1919 the disease had increased fifty per cent.

ARMY HOSPITALS.—A recent report of the Surgeon General shows that on January 9 there were still fourteen army hospitals in operation with 14,370 soldiers as bed patients. The report stated that on February 15 General Hospital No. 20, Whipple Barracks, Arizona, and General Hospital No. 42, Hampton, Virginia, would be closed, the patients in need of further treatment to be transferred to other hospitals.

MORTALITY STATISTICS IN THE UNITED STATES.—The annual mortality statistics issued by the Census Bureau on February 2, 1920, shows that the death rate in the United States for 1918 was the highest on record. There were 1,471,367 deaths for the year, representing a rate of 18 per 1,000 population in the death registration area of thirty states and twenty-seven cities, with a total estimated population of 81,868,104.

Of the total deaths 477,467, or more than 32 per cent., were due to influenza and pneumonia, 380,996 having occurred in the last four months of the year when an epidemic prevailed. The rate for influenza and pneumonia was 583.2 per 100,000. Influenza caused 244,681 deaths and pneumonia 232,786, showing rates of 289.9 284.3 per 100,000, respectively, these being the highest rates which have ever appeared for these causes. The rate in 1917 for influenza was 17.2 and for pneumonia 140.8.

The other principal causes of death were organic diseases of the heart, tuberculosis, acute nephritis, Bright's disease and cancer, which together were responsible for 391,391 deaths or nearly 27 per cent. of the total during the year.

BOSTON AND MASSACHUSETTS.

WEEK'S DEATH RATE IN BOSTON.—During the week ending March 13, 1920, the number of deaths reported was 250 against 275 last year, with a rate of 16.13 against 18.01 last year. There were 49 deaths under one year of age against 46 last year.

The number of cases of principal reportable diseases were: Diphtheria, 24; scarlet fever, 60; measles, 199; whooping cough, 91; typhoid fever, 3; tuberculosis, 48.

Included in the above were the following cases of non-residents: Diphtheria, 3; scarlet fever, 13; measles, 1; tuberculosis, 5.

Total deaths from these diseases were: Diphtheria, 2; scarlet fever, 1; measles, 2; whooping cough, 3; tuberculosis, 16.

Included in the above were the following non-residents: Measles, 1.

Influenza cases, 80; influenza deaths, 11.

INFLUENZA IN BOSTON AND MASSACHUSETTS.—On February 26 there were reported to the health department in Boston 55 cases of influenza with 10 deaths from influenza and 6 from pneumonia. Holden reported 68 cases for the preceding several days; Stoneham, 43; and Haverhill, 40. The total number of cases throughout the state was 482. On February 28 there were reported 3 deaths from influenza in Boston and 11 from pneumonia. There were 233 cases of influenza throughout the state, of which 37 were in Boston. During the week there were 450 cases of influenza in Boston, with 73 deaths. There have been 44 deaths among the patients at the Long Island Hospi-

tal during the past three weeks. On March 2, 5 deaths from influenza and 7 from pneumonia were reported in Boston, and on March 3 there were 32 cases of influenza with 4 deaths, and 9 deaths from pneumonia.

EXCHANGE PROFESSOR FROM THE INSTITUTE OF TECHNOLOGY.—Dr. William T. Sedgwick, senior professor of the Institute of Technology, and head of the department of biology and public health, has been elected to be the first exchange professor with the British universities of Cambridge and Leeds. He will leave for England in April and will return to Boston in September.

HARVARD PROFESSORS IN GENEVA.—Dr. Simeon Burt Wolbach, Dr. Frank H. Palfrey, and Dr. Monroe A. McIvor, of the Harvard Medical School, and Prof. Henry Pinkerton of the Massachusetts Institute of Technology, have arrived at Geneva, where they will confer with the general medical director of the League of Red Cross Societies concerning the work which is to be carried on in Poland in the study of typhus fever. Professor George Whipple of Harvard University has reached Geneva, to take up his duties as chief of the sanitary department of the Red Cross League.

HARVARD INFANTILE PARALYSIS FUND.—The Harvard Infantile Paralysis Commission has received contributions to the amount of $10,426.87, and is urgently in need of additional funds in order to carry on its work.

PUBLIC BEQUESTS.—By the will of the late Mr. Wallace F. Robinson, the Industrial School for Crippled and Deformed Children is given $10,000, and the Boston Nursery for Blind Babies, $5,000.

DENTAL CLINIC FOR ARLINGTON SCHOOLS.—There is to be established by the Arlington Board of Health a dental clinic for the public schools. School children are to have dental care for nominal fees, or free of charge if their parents are unable to pay for the service.

DR. SALLY ROBINSON CREIGHTON-BEST died at her home in New York on February 6, 1920. Dr. Best was graduated from Cornell Medical College in 1899. During the war she placed herself in the service of the United States Government in the censorship of drugs. At the end of the war she resumed the practice of medicine in New York. Dr. Best was an active member of the Executive Committee of the American Women's Hospitals.

Obituaries.

ELMER ERNEST SOUTHARD, A.M., M.D., Sc.D.

DR. SOUTHARD died February 8, in New York, of pneumonia, after an illness of three days. He had, during the week, spoken at a meeting of the New York Neurological Society and also given an address at the annual meeting of the National Committee of Mental Hygiene. His death came, therefore, at the height of his activities and without warning, or knowledge on his part of the seriousness of his condition during the short period of consciousness preceding the end.

Born in Boston July 28, 1876, he went through the conventional preliminary education of a Boston boy,—the Boston Latin School, Harvard College in the class of 1897, and the Harvard Medical School in the class of 1901. He was always distinguished as a student of independence and originality. He was not given to the ordinary athletic interests of youth, and thereby gained time for reading, which from his earliest years, was an absorbing occupation. He learned easily, his memory was peculiarly retentive and he enjoyed his work as others enjoy their play. In college he was early interested in grammar, and from this turned to philosophy; he was especially influenced by the teachings of William James and Josiah P. Royce, which was apparent in all his later work, James leading him in the direction of practical formulations and Royce in the direction of logical speculation and metaphysical abstraction. The natural sciences also engaged his attention in his collegiate days, as attested by the fact that he was graduated with distinction both in philosophy and natural history. In 1902, he was given the degree of A.M. from Harvard and in 1917 George Washington University conferred on him the honorary degree of Doctor of Science. Chess was one of his serious amusements; during his stay at Cambridge he was the intercollegiate champion in each of the four years and became one of the really distinguished chess players of the country.

With a mind versatile and well trained, he began his active professional career. He entered with enthusiasm into the study of pathology under the direction of Dr. W. T. Councilman and Dr. F. B. Mallory and served a term

in the pathological laboratory of the Boston City Hospital. His special interest in the nervous system soon asserted itself, and during this period he spent some months abroad with Weigert, Nissl, and Kraepelin. After completing his preliminary work at the Boston City Hospital he began to teach, finally taking over the work in neuropathology at the Harvard Medical School and passing rapidly through the various grades until he was appointed to the Professorship of Neuropathology endowed by Dr. W. N. Bullard, a position which he filled brilliantly until his death, a period of about ten years.

In 1906 Southard became identified with the Danvers Insane Hospital as pathologist and assistant physician and there laid the foundation for his work in correlation and classification of pathological and clinical material. He systematized the work at this hospital; he published many papers: he attracted men to his laboratory and by degrees his influence spread throughout the institutions of the State. He saw the needs and the deficiencies as well as the possibilities of the State Hospitals and began to plan for their development along the broad lines of research. The establishment of the Boston Psychopthic Hospital he had looked forward to with eagerness and faith in its possibilities as a unifying centre for psychiatric investigation both from the clinical and laboratory standpoint. He was made its director when it was opened in 1912, and quickly gathered about him a group of workers, who forthwith became productive. He established a series of publications, and papers by him and his colleagues appeared in rapid succession on all phases of the complicated problems which he had set himself to elucidate. He became identified with the work of the State and in addition to his connection with the Harvard Medical School for many years held the position of pathologist to the State Board of Insanity and the Commission on Mental Disease, in which he was ably assisted by Dr. Myrtelle M. Canavan. In this latter capacity he collected an enormous amount of material and brought order out of the confusion which had hitherto prevailed.

He saw far into the future; he was always planning, systematizing knowledge already attained, and seeing possibilities yet far from attainment. He early recognized the importance of an out-patient department in mental disease and such a department was immediately established at the Psychopathic Hospital at first under the charge, not of a psychiatrist but of a pediatrician, Dr. W. P. Lucas, to the end that psychiatry might be brought into closer union with general medicine. Out of this eminently successful out-patient experiment has developed a social service department under the leadership of Miss Mary C. Jarrett, which has been a pioneer in the socializing of medical and psychiatric problems. With the constantly expanding scope of his ideas he saw clearly the possibilities for good of systematic social service and of late years directed much time and thought to its expansion. The School for Psychiatric Social Workers established at Smith College in 1918, stimulated by the exigencies of the war, was one of his successfully thought-out plans of expansion. He became increasingly impatient of detail as his constructive ideas took form and developed, and was continually projecting larger and more comprehensive programs which, had he lived, would doubtless have effected a far-reaching influence in the social and medical developments of the immediate future. His influence in national affairs was rapidly developing. He was an ardent supporter of the National Committee on Mental Hygiene and was planning an attack upon the ultimate causes of social unrest when his work was interrupted by death. During a part of the war he served as Major in the Chemical Warfare Division, for which his diversified talents and his wide range of scientific attainment fitted him, and within a short time he was appointed chairman of the Neuropsychiatric Division of the National Research Council, a position which would have given his unique capacity for discerning problems and planning means for their solution a broad field of application.

His society membership was, as might be expected, large, and was not confined to his special subject. His breadth of knowledge was such that he could not fail to bring to the deliberation of learned societies of whatsoever character, new and original ideas. He was a member of the Association of American Physicians, the American Academy of Arts and Sciences, the American Neurological Association, the National Association for the Study of Epilepsy, the American Genetic Association, the American Medical Association, the American Medico-Psychological Association, of which he

was president in 1919; and of many of the state societies. At the time of his death he was chairman-elect of the section on nervous and mental diseases of the American Medical Association and president-elect of the Boston Society of Psychiatry and Neurology. He was also a director of the Bedford Hills Laboratory Bureau of Social Hygiene, of the National Committee of Mental Hygiene and of the Eugenics Record Office. Unlike many men with large society membership, he took an active part in the meetings of the various societies to which he belonged. He was an indefatigable traveler and reader of papers. His capacity in these directions seemed inexhaustible and, what is more, he always had something definite to say. His productivity was altogether exceptional. He had published in the neighborhood of 150 original papers, had written two books, one in collaboration with Dr. H. C. Solomon, and was projecting many more.

It is difficult at this time to summarize the achievements of such a man. He was a theorist in the best sense of that term; his theories resulted in action. He accomplished in great measure what he had planned. He was an admirable propagandist. Some of his critics have regarded his schemes as visionary and speculative. The tangible results of his activities should be a sufficient refutation of this criticism. He has unquestionably been one of the strong influences in moulding public opinion toward a more rational attitude regarding the great problems of psychiatry and in demonstrating the possibilities of accomplishment in this field, beset as it is with prejudice and ignorance. He was always interested in correlation, logical reasoning and classification, which had recently found expression in his "Key Principle" of diagnosis, and his rearrangement of unrelated clinical groups into a logical order. He was a skilful microscopist and histologist as well as a gross pathological anatomist. He made notable contributions to the histology of the cortex in mental disease, to the study of the various neuroglia reactions, and to lesions of the nervous system in general. His monographic work on feeble-mindedness in connection with the Waverley School for the Feeble-minded should be particultrly mentioned in this connection. He did his share toward the correlation of physical defect or alteration with mental changes; he, in fact, approached mental phenomena largely from the anatomical standpoint and had a somewhat secondary interest in the dynamic psychology of the present day. As a teacher he was at times discursive and difficult to follow, but his lectures were invariably interesting and suggestive. He regarded his time and, no doubt, rightly, as too valuable to devote to the individual undergraduate student unless he happened to be of particular promise; on the other hand, as an instigator of research he was preëminent both by example and precept. He was a veritable inspiration to those with whom he was associated in productive work. This constituted his unique power in the community. He was not only a tireless worker himself but he stimulated others to similar effort.

He married Dr. Mabel Fletcher Austin in 1906 and found in her understanding and sympathy a constant incentive to the best work. She, with three children, two sons and a daughter, survive him. E. W. T.

THOMAS AMORY DE BLOIS, M.D.

THOMAS AMORY DEBLOIS, M.D., laryngologist, died at his home in Boston February 27, at the age of 72 years. He was the eldest son of John Amory DeBlois (Harvard 1816) and Emily J. (Rousse) DeBlois, of Virginia, of French descent. The father, descendant by birth from an old Boston family, was a cotton merchant in Columbus, Georgia, and there the son was born January 27, 1848. When the boy was only seven years of age, in 1855, the father died and the widow brought her young son to Newport, R. I., where he began his education in a private school. When he was twelve, he went to Vevey, Switzerland, for a two-years' schooling at Pension Sillig, and in 1863, at the age of fifteen, he entered the U. S. Naval Academy at Annapolis, graduating in 1868 as midshipman, advancing to ensign the following year and to lieutenant-commander in 1873. The two years 1875-76 he was stationed at the U. S. Navy Yard at Pensacola, Florida.

Deciding to study medicine, he entered Dartmouth Medical School and received the degree of M.D. in 1878; the same year he took an additional M.D. at the University of New York City, giving special attention to diseases of the

throat under the instruction of Dr. F. H. Bosworth. He continued his connection with the Navy until 1881, when he settled in Boston. Before resigning, he started a clinic for diseases of the throat, but was soon ordered South to join his ship for a long cruise. He had not reached the place of embarkation before he decided that medicine had a stronger hold on him than the sea, and on February 1, 1881, he sent in his resignation, returned to Boston and again took charge of his embryo clinic, which had been under the care of a colleague during his absence, who was much surprised to see him return so soon. He retained this clinic until 1890.

Another appointment was as physician to diseases of the throat at the Boston City Hospital in 1884, where he had as colleagues Dr. F. H. Hooper, Dr. J. W. Farlow and Dr. G. A. Leland for many years, giving up only when he had reached the age limit of sixty-four. From 1893 to 1906 he was clinical instructor in laryngology in the Harvard Medical School.

He was elected a member of the American Laryngological Association in 1882 and was its vice-president in 1900. He was also a member of the New England Otological and Laryngological Society, the Massachusetts Medical Society and the Society for Medical Improvement. Being much interested in mechanical appliances of all sorts, he devised a number of instruments for use in his specialty and modified others to meet his own requirements, as he was a man of large frame and many of the ordinary instruments were not well adapted for his use without some modification.

During all these years his interest in naval matters continued and he was associated with Capt. John C. Soley in forming the Massachusetts Naval Militia, the first organization of the kind in the United States. He was also surgeon to the school-ship *Enterprise*.

A favorite recreation of his was fencing, in which he excelled even in his youth, taking a first prize when at the Naval Academy. Later in life he was one of the most expert fencers at the Boston Athletic Association, where his superior skill was recognized by all.

He was of a jovial nature, hospitable, a good raconteur and sociable to a high degree.

He married at Newport, R. I., October 3, 1871, Louisa D. Anderson, of New York, who died in 1910. Surviving him are a daughter, Elizabeth Amory, and a son, Lewis Amory, a graduate of Harvard, S. B., 1899, and now manager of the safety department of the Du Pont Company, of Wilmington, Delaware.

J. W. F.

The Massachusetts Medical Society.

THE next annual meeting will be held at the Boston Medical Library, June 8 and 9, 1920. Dr. R. H. Miller, 434 Marlborough Street, Boston, Chairman of the Committee of Arrangements.

OFFICERS OF THE MASSACHUSETTS MEDICAL SOCIETY.

Chosen by the Council, June 3, 1919.

Alfred Worcester, Waltham, President.
Arthur R. Crandell, Taunton, Vice-President.
Walter L. Burrage, Jamaica Plain, Secretary.
Arthur K. Stone, Framingham Center, Treasurer.
Edwin H. Brigham, Brookline, Librarian.

STANDING COMMITTEES.

The first named is the chairman of each committee.

Of Arrangements.—R. H. Miller, C. H. Lawrence, Jr., Donald Macomber, A. W. Reggio, J. B. Swift, K. G. Percy.

On Publications and Scientific Papers.—E. W. Taylor, R. B. Osgood, F. T. Lord, R. M. Green, A. C. Getchell.

On Membership and Finance.—C. M. Green, Algernon Coolidge, Jr., Samuel Crowell, Gilman Osgood, Homer Gage.

On Ethics and Discipline.—J. W. Bartol, Henry Jackson, T. J. Robinson, David Cheever, F. W. Anthony.

On Medical Education and Medical Diplomas.—Channing Frothingham, C. F. Painter, J. F. Burnham, A. G. Howard, R. L. DeNormandie.

On State and National Legislation.—Alfred Worcester, F. G. Wheatley, E. H. Stevens, J. S. Stone, A. R. Crandell.

On Public Health.—E. H. Bigelow, Annie L. Hamilton, E. F. Cody, Victor Safford, R. I. Lee.

OFFICERS OF THE DISTRICT MEDICAL SOCIETIES, 1919-1920.

Elected by the District Medical Societies.

BARNSTABLE.—F. A. Binford, Hyannis, President; C. P. Curley, Provincetown, Vice-President; C. J. Bell, Wellfleet, Secretary; H. B. Hart, Yarmouthport, Treasurer; E. E. Hawes, Hyannis, Librarian.

BERKSHIRE.—E. H. Taylor, Pittsfield, President; W. P. Kelly, Pittsfield, Vice-President; O. L. Bartlett, Pittsfield, Secretary; J. D. Howe, Pittsfield, Treasurer.

BRISTOL NORTH.—H. G. Ripley, Taunton, President; Sumner Coolidge, Middleborough, Vice-President; A. R. Crandell, Taunton, Secretary; R. D. Dean, Taunton, Treasurer.

BRISTOL SOUTH.—J. A. Barré, Fall River, President; E. P. Gardner, New Bedford, Vice-President; A. J. Abbe, Fall River, Secretary and Treasurer.

ESSEX NORTH.—J. J. O'Sullivan, Lawrence, President; D. D. Murphy, Amesbury, Vice-President; J. Forrest Burnham, Lawrence, Secretary and Treasurer.

ESSEX SOUTH.—W. T. Hopkins, Lynn, President; R. E. Foss, Peabody, Vice-President; G. E. Tucker, Salem, Secretary; G. Z. Goodell, Salem, Treasurer; C. M. Cobb, Lynn, Librarian.

FRANKLIN.—Charles Moline, Sunderland, President; E. C. Thorn, Deerfield, Vice-President; F. A. Millett, Greenfield, Secretary and Treasurer.

HAMPDEN.—A. L. Damon, North Wilbraham, President; G. L. Gabler, Holyoke, Vice-President; H. L. Smith, Springfield, Secretary and Treasurer.

HAMPSHIRE.—H. J. Rockwell, Amherst, President; S. A. Clark, Northampton, Vice-President; E. E. Thomas, Northampton, Secretary; J. G. Hanson, Northampton, Treasurer; F. E. Dow, Northampton, Librarian.

MIDDLESEX EAST.—R. D. Perley, Melrose, President; C. L. Sopher, Wakefield, Vice-President; A. E. Small, Melrose, Secretary; Richard Dutton, Wakefield, Treasurer; G. W. Nickerson, Stoneham, Librarian.

MIDDLESEX NORTH.—J. H. Nichols, Tewksbury, President; E. J. Welch, Lowell, Vice-President; J. Y. Rodger, Lowell, Secretary; T. B. Smith, Lowell, Treasurer; P. J. Meehan, Lowell, Librarian.

MIDDLESEX SOUTH.— H. T. Baldwin, Chestnut Hill, President; E. H. Bigelow, Framingham, Vice-President; L. S. Hapgood, Cambridge, Secretary; Edward Mellus, Newton, Treasurer.

NORFOLK.— F. P. Denny, Brookline, President; G. W. Winchester, Mattapan, Vice-President; Bradford Kent, Dorchester, Secretary; G. W. Kaan, Brookline, Treasurer.

NORFOLK SOUTH.—E. H. Bushnell, Quincy, President; F. E. Jones, Quincy, Vice-President; C. A. Sullivan, South Braintree, Secretary, Treasurer, and Librarian.

PLYMOUTH.—Joseph Frame, Rockland, President; F. J. Hanley, Whitman, Vice-President; W. C. Keith, Brockton, Secretary and Treasurer.

SUFFOLK.—— —— —— —— President; G. G. Sears, Boston, Vice-President; G. G. Smith, Boston, Secretary; D. L. Bristol, Boston, Treasurer; W. P. Coues, Boston, Librarian.

WORCESTER.—W. J. Delahanty, Worcester, President; F. H. Baker, Worcester, Vice-President; G. A. Dix, Worcester, Secretary; G. O. Ward, Worcester, Treasurer; A. C. Getchell, Worcester, Librarian *pro tem.*

WORCESTER NORTH.—W. F. Robie, Baldwinsville, President; C. E. Woods, Lunenburg, Vice-President; C. H. Jennings, Fitchburg, Secretary; F. H. Thompson, Jr., Fitchburg, Treasurer; L. F. Baker, Fitchburg, Librarian.

Miscellany.

MEDICAL VETERANS OF THE WORLD WAR.

An association of Medical Veterans of the World War was organized at Atlantic City, in June, 1919, at the time of the meeting of the American Medical Association, and a constitution and by-laws were adopted. About 2800 physicians have already joined and all others who are eligible are invited to join the society.

The constitution states that "The dominant purpose of this Association shall be patriotic service. The objects of this Association shall be: To prepare and preserve historical data concerning the medical history of the war; to cement the bonds of friendship formed in the service; to perpetuate the memory of our medical comrades who made the supreme sacrifice in this war; to provide opportunity for social intercourse and mutual improvement among its members; to do all in our power to make effective in civil life the medical lessons of the war, both for the betterment of the public health and in order that preparedness of the medical profession for possible war may be assured."

The organization of the society provides for state and local organizations wherever the members desire it, and in some states, such as Wisconsin, organization has already been effected. It is desired by the National Association that those who are already members meet together in larger and smaller groups at the first convenient opportunity and effect a local organization, with a chairman and secretary, and also at the next meeting of the state medical society that a place be provided on the program for the Medical Veterans. The organization of the society is based on democratic principles and it is hoped that the members who have already joined will take the initiative and organize their own state and local societies. The National organization will assist by furnishing application blanks and copies of the constitution and by-laws, and, if desired, stationery.

The first things to be done after the organization of a state society is effected is to elect a councilor to the next general council of the organization, to represent the state society at the next annual meeting of the Veterans at New Orleans on the first day of the meeting of the American Medical Association, April 26, 1920.

A badge or button for members of the society is being made and will soon be ready for distribution. Communications may be addressed to the Secretary, Medical Veterans of the World War, Army Medical School, Washington, D. C.

ERRATUM.

The following correction is made of an error printed in an article on Citrate Transfusion published in the JOURNAL on February 5, 1920:

Under *Typing*, a statement was made that Type II may receive blood from Types II, III, and IV. This is an error; Type II may receive blood only from Type II or Type IV, Type III can never be used. The correct statement is:

Type I may receive blood from Types I, II, III, and IV. Type II may receive blood from Types II and IV (not Type III). Type III may receive blood from Types III and IV, and Type IV may receive blood from Type IV alone.

SOCIETY NOTICES.

BOSTON MEDICAL LIBRARY, in conjunction with the SUFFOLK DISTRICT MEDICAL SOCIETY, Medical Section meeting, at John Ware Hall, Wednesday, March 24, 1920, at 8.15 P.M.

Treatment of Hemorrhage, Dr. Roger I. Lee.

Treatment of Myeloid Leukemia, Dr. Francis W. Peabody.

Aplastic Anemia, Dr. Ralph C. Larrabee.

EDWIN A. LOCKE, M.D., *Chairman.*
GEORGE R. MINOT, M.D., *Secretary.*

THE NORFOLK DISTRICT MEDICAL SOCIETY.—A regular meeting of the Society, at Masonic Temple, 171 Warren Street, Roxbury, Tuesday, March 30, 8.15 P.M.

Communications:

Shall Sex Hygiene be Taught in the Schools?, Merrill E. Champion, M.D.

Sex Education for Boys, Arthur N. Broughton, M.D.

Sex Education for Girls, Mary R. Lakeman, M.D.

Sex Education at Harvard, Roger I. Lee, M.D.

Censors' meeting, May 6.

BRADFORD KENT, M.D., *Secretary.*

RECENT DEATHS.

DR. P. FRANCIS WALKER died at his home in Providence on February 27, at the age of 61 years. He was a graduate of the Boston University Medical School, and had practised in Providence since 1881.